

Potential Mine Methane Capture Compliance Offset Protocol Technical Working Group

California Air Resources Board

May 21, 2013

1:30 - 3:30 PDT

Conference Call Information

- Meeting agenda, slides, and materials posted at:
<http://www.arb.ca.gov/cc/capandtrade/protocols/mmcprotocol.htm>
- Call-in numbers:
 - Domestic line: 1-800-779-6985
 - International line: 1-210-234-9678
 - Passcode for both: 48595

Suggested Supplemental Material

- SAIC for the Climate Action Reserve (2009) Development of a common practice standard for a coal mine methane project protocol. Available at:
<http://www.climateactionreserve.org/wp-content/uploads/2009/10/Reserve-CMM-Performance-Standard-Analysis-Report.pdf>
- Climate Action Reserve (2012) Coal Mine Methane Project Protocol Version 1.1 Appendix A – Summary of Performance Standard Development. Available at:
http://www.climateactionreserve.org/wp-content/uploads/2009/10/Coal_Mine_Methane_Project_Protocol_V1.1.pdf

Agenda

- Update on methane ownership and use rights on federal lands, if warranted
- Eligibility of pipeline injection at active underground mines
 - Potential end uses for captured mine methane
 - Cap-and-Trade regulation requirements for ARB compliance offset protocols
 - Relevant federal health & safety regulations
 - Assessing common practice at mines with drainage systems
 - Potential thresholds for pipeline injection eligibility

End Uses for Mine Methane at Active Underground Mines (1)

Recovery Method	Gas Quality	Utilization Options
Gob Well	Medium-Btu Gas (350-950 Btu/scf)	<ul style="list-style-type: none">• Upgrade to pipeline quality• Co-firing with coal in utility / industrial boilers• Fuel for internal combustion engines• Enrichment through gas processing• Brine water treatment• Greenhouse heating• Blast furnace use (supplement to natural gas)• Production of liquefied gas• Fuel for thermal dryers in coal processing plant• Fuel for micro-turbines• Fuel for heating mine facilities• Fuel for heating mine intake air• Use in fuel cells

End Uses for Mine Methane at Active Underground Mines (2)

Recovery Method	Gas Quality	Utilization Options
Vertical Wells and Horizontal Boreholes	High-Btu Gas (>950 Btu/scf)	<ul style="list-style-type: none">• Natural gas pipeline fuel• Chemical feedstock for ammonia, methanol, and acetic acid production• Transportation fuel as compressed or liquefied gas
VAM	<1% CH ₄	<ul style="list-style-type: none">• Combustion air in power production• Combustion air in internal combustion engines or turbines• Conversion to energy using oxidation technologies

Adapted from U.S. EPA Coalbed Methane Outreach Program, Identifying Opportunities for Methane Recovery at U.S. Coal Mines: Profiles of Selected Gassy Underground Coal Mines 2002-2006. September 2008, Revised 2009.

Offset Requirements in Cap-and-Trade Regulation

- Per AB32, ARB offset credits must be real, additional, quantifiable, permanent, verifiable, and enforceable. (Section 95802(a)(12))
- “Additional”, in the context of offset credits, means greenhouse gas emission reductions or removals that exceed any greenhouse gas reduction or removals otherwise required by law, regulation, or legally binding mandate, and that exceed any greenhouse gas reductions or removals that would otherwise occur in a conservative business-as-usual scenario. (Section 95802(a)(4))

Relevant Regulations

There are two federal health and safety regulations related to the installation of a drainage system:

- 30 CFR § 75.323: methane concentrations must be kept below 1 percent at the working face
- Federal Mine Safety and Health Act of 1977: limits on the respirable dust levels that miners are exposed to

No regulation exists mandating capture and destruction of extracted methane nor is the regulation of mine methane expected in the near future

Assessing Common Practice

What is likely to occur under a conservative business-as-usual scenario?

- Is installation of a drainage system a response to health and safety regulations?
 - What are the characteristics of mines with drainage systems?
 - Do all mines with these characteristic use drainage systems?
- Is pipeline injection common practice for mines with drainage systems?
 - What percentage of active underground mines with drainage systems capture extracted methane and inject into pipeline?
 - What percentage of methane extracted from active underground mine drainage systems is injected into pipeline?

Potential Thresholds for Pipeline Injection Eligibility

- Thresholds previously assessed by CAR include:
 - Mining method (longwall v. room and pillar)
 - Methane liberation rate (bcf per year)
 - Well source (vertical wells/horizontal boreholes/gob)
 - Gas composition (percentage of methane)
 - Gas quality (composition of contaminants)
 - Well life (as a proxy for gas quantity)
- What is the viability of these thresholds?
- Are there other potential thresholds to evaluate?

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